OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **WILSON POND** the program coordinators recommend the following actions.

We would like to encourage the association to conduct more sampling events in the future. With a limited amount of data it is difficult to determine water quality trends. Since weather patterns and activity in the watershed can change throughout the summer it is a good idea to sample the lake several times over the course of the season.

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *fairly stable* in-lake chlorophyll-a trend. The chlorophyll concentration was slightly lower than in 1999, however, this is based on only one sample. Sampling more than once, and in earlier summer months, will yield a more accurate trend. Chlorophyll concentration remains well below the NH mean reference line, and have yet to show signs of increased production. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are internal and external sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *variable* trend in lake transparency. Transparency was the lowest ever for the lake since 1992 and remained below the state mean. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show an *improving* trend for in-lake phosphorus levels, which means levels are decreasing. The September phosphorus result was low for the pond and below the NH median. It is hard to establish an accurate trend for phosphorus in the pond and we recommend increasing the sampling frequency during the summer. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Conductivity was back to normal this season from the increase measured in the dry season of 1999 (Table 6). This is a positive sign for the pond since rainfall often causes excess nutrients to be washed into lakes and ponds, which can elevate the conductivity. Conductivity increases can also indicate the influence of human activities on surface waters. Septic system leachate, agricultural runoff, iron deposits, and road runoff can each influence conductivity readings.

- Inlet phosphorus was higher this season (Table 8), most likely as a result of testing stagnant waters, where accumulation of organic debris can occur. Organic debris can release phosphorus into the water during the analysis. Since the water is usually stagnant where the Inlet enters the pond, it may be useful to find an upstream site where the water flows continuously throughout most of the summer.

- Dissolved oxygen was again high at all depths of the lake (Table 9). As stratified lakes age, oxygen is depleted in the lower layer by the process of decomposition. The lack of this aging indicator is a sign of the lake's overall health.

- *E. coli* originates in the intestines of warm-blooded animals (including humans) and is an indicator of associated and potentially harmful pathogens. Bacteria concentrations were very low at the sites tested (Table 12), and well below the state standard of 406 counts per 100 mL for Class B surface waters. If residents are concerned about septic system impacts, testing when the water table is high or after rains is best. Also, there is concern about the number of ducks frequenting the pond. Waterfowl can cause elevated bacteria concentrations, and we strongly recommend that residents do not feed the ducks. If monitors are concerned about the ducks impact of the water quality testing when the ducks are present and of most concern is recommended. Please contact the Franklin Pierce College Laboratory at 899-4384 to set up a time for picking up the appropriate bottles.

NOTES

- Monitor's Note (9/22/00): Inlet stagnant, sample taken anyway. Saw three ducks (lots of feathers floating in the Inlet). About 15 ducks at South end, by the beach. Ducks usually in East cove too (saw about 10). Water seen coming out of pipe from a house. Coming from retaining wall underground (East Cove), from an Artesian well.

USEFUL RESOURCES

Comprehensive Shoreland Protection Act, RSA 483-B, *WD-BB-35*, NHDES Fact Sheet. (603) 271-3503 or www.state.nh.us

Water Sampling Protocol for E. coli Testing, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Bacteria in Surface Waters, *WD-BB-14*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Answers to Common Lake Questions, NHDES-WSPCD-92-12, NHDES Booklet, (603) 271-3503.

In Our Backyard. 1994. Terrence Institute, 4 Herbert St., Alexandria, VA. 22305, or call (800) 726-5253, or www.terrene.org

Phosphorus in Lakes, WD-BB-20, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

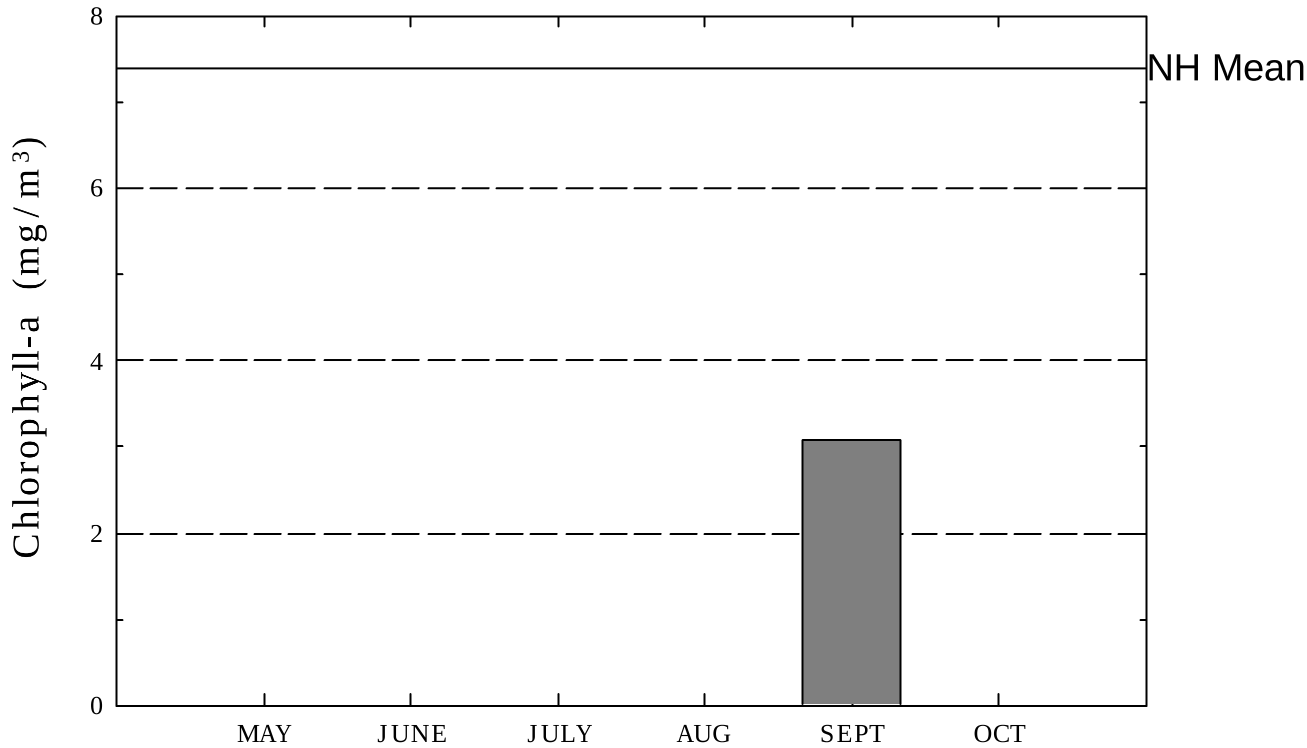
What is a Watershed?, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Weed Watchers: An Association to Halt the Spread of Exotic Aquatic Plants, WD-BB-4, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

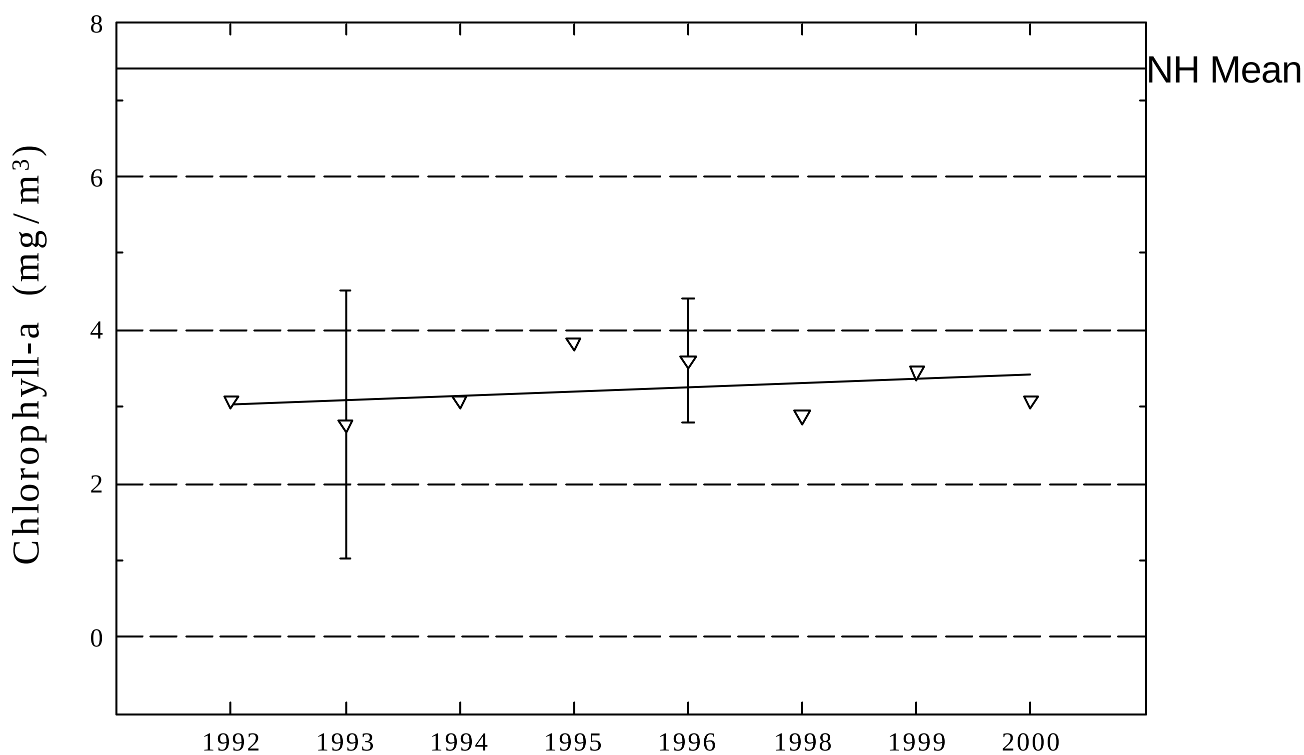
Aquatic Plants and Their Role in Lake Ecology, WD-BB-44, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Wilson Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



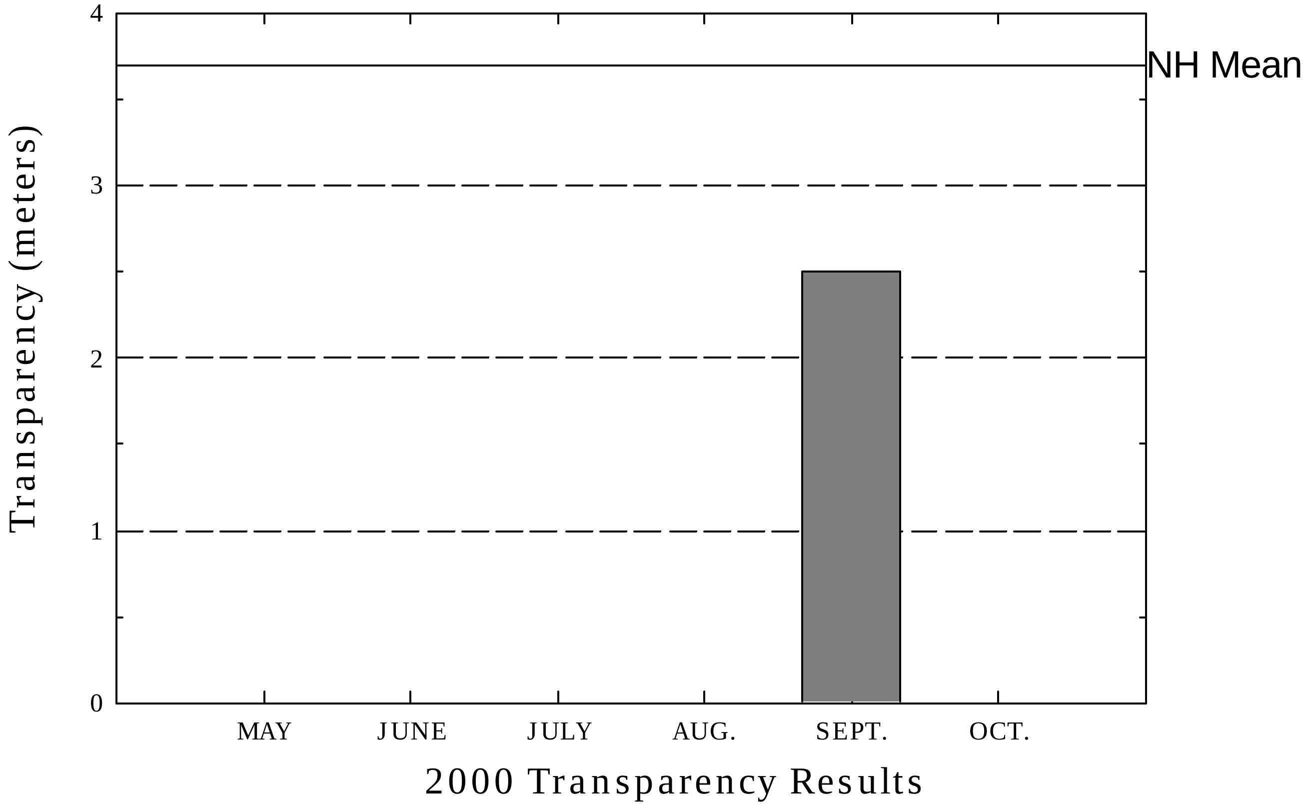
2000 Chlorophyll-a Results

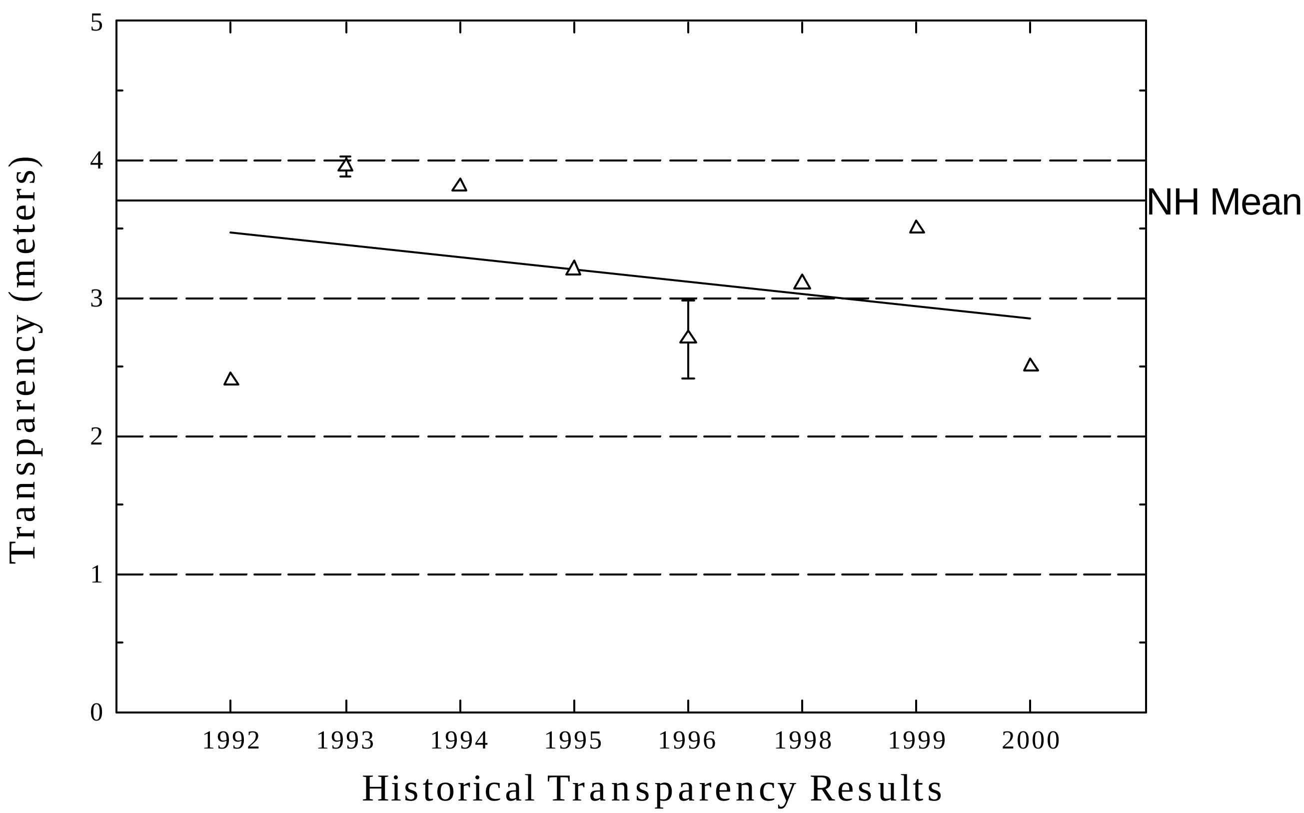


Historical Chlorophyll-a Results

Wilson Pond

Figure 2. Monthly and Historical Transparency Results





Wilson Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

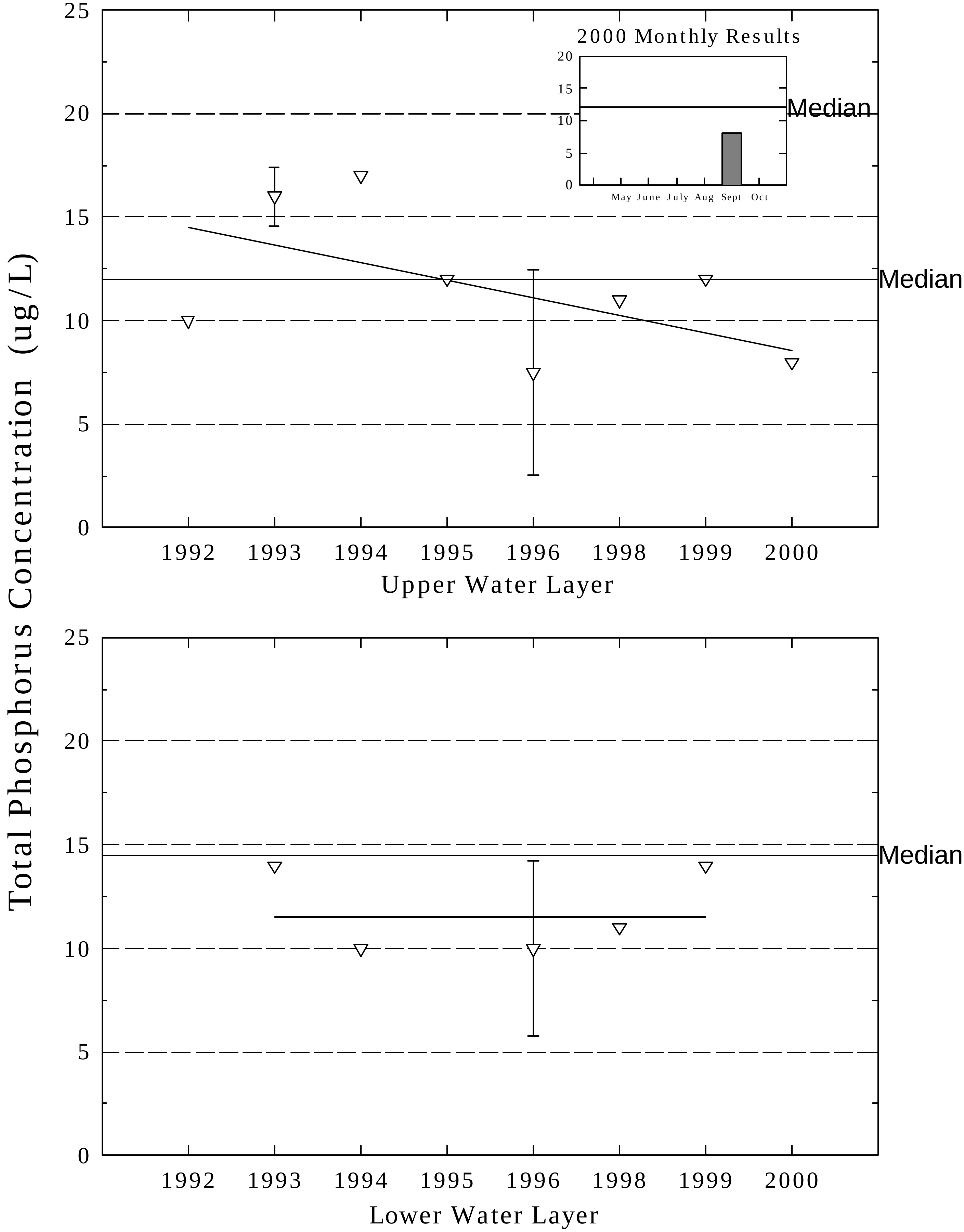


Table 1.

WILSON POND
SWANZEY

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1992	3.08	3.08	3.08
1993	1.54	4.01	2.77
1994	3.08	3.08	3.08
1995	3.84	3.84	3.84
1996	3.04	4.17	3.60
1998	2.89	2.89	2.89
1999	3.46	3.46	3.46
2000	3.08	3.08	3.08

Table 2.

WILSON POND

SWANZEY

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
10 / 09 / 1992	CRYPTOMONAS	41
	SYNURA	29
07 / 14 / 1993	FILAMENTOUS BLUE-GREEN	46
	MELOSIRA	15
	CONJUGATING FIL.	15
08 / 01 / 1993	PENNATE	44
08 / 16 / 1995	DINOBRYON	29
	GLOEOCYSTIS	21
	OSCILLATORIA	14
08 / 21 / 1996	MALLOMONAS	57
	SPHAEROCYSTIS	20
07 / 30 / 1998	CHRYSOSPHAERELLA	79
	TABELLARIA	10
08 / 09 / 1999	PHORMIDIUM	40
	DINOBRYON	11
	DESMIDIUM	9

Table 3.

WILSON POND

SWANZEY

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1992	2.4	2.4	2.4
1993	3.9	4.0	3.9
1994	3.8	3.8	3.8
1995	3.2	3.2	3.2
1996	2.5	2.9	2.7
1998	3.1	3.1	3.1
1999	3.5	3.5	3.5

Table 4.

WILSON POND
SWANZEY

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1992	6.61	6.61	6.61
	1993	6.81	7.02	6.90
	1994	6.67	6.67	6.67
	1995	6.60	6.60	6.60
	1996	6.32	6.53	6.41
	1998	6.84	6.84	6.84
	1999	6.49	6.49	6.49
	2000	6.74	6.74	6.74
HYPOLIMNION				
	1993	6.85	6.85	6.85
	1994	6.65	6.65	6.65
	1996	6.08	6.34	6.19
	1998	6.88	6.88	6.88
	1999	6.46	6.46	6.46
INLET				
	1992	6.54	6.54	6.54
	1993	6.77	6.77	6.77
	1994	6.53	6.53	6.53
	1995	6.20	6.20	6.20
	1996	6.17	6.34	6.25
	1998	6.71	6.71	6.71
	1999	6.51	6.51	6.51
	2000	6.38	6.38	6.38

Table 4.

WILSON POND

SWANZEY

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
OUTLET				
	1992	6.69	6.69	6.69
	1993	6.90	6.90	6.90
	1994	6.83	6.83	6.83
	1995	6.47	6.47	6.47
	1996	6.60	6.74	6.66
	1998	6.95	6.95	6.95
	1999	6.52	6.52	6.52
	2000	6.65	6.65	6.65

Table 5.

WILSON POND

SWANZEY

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1992	5.00	5.00	5.00
1993	5.70	5.90	5.80
1994	5.10	5.10	5.10
1995	5.10	5.10	5.10
1996	5.90	6.30	6.10
1998	6.30	6.30	6.30
1999	6.00	6.00	6.00
2000	6.30	6.30	6.30

Table 6.

WILSON POND
SWANZEY

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1992	72.4	72.4	72.4
	1993	90.6	93.1	91.8
	1994	82.1	82.1	82.1
	1995	77.3	77.3	77.3
	1996	82.4	83.8	83.1
	1998	78.4	78.4	78.4
	1999	99.5	99.5	99.5
	2000	86.3	86.3	86.3
HYPOLIMNION				
	1993	91.8	91.8	91.8
	1994	83.0	83.0	83.0
	1996	83.2	84.7	83.9
	1998	77.5	77.5	77.5
	1999	101.2	101.2	101.2
INLET				
	1992	82.2	82.2	82.2
	1993	93.6	93.6	93.6
	1994	73.7	73.7	73.7
	1995	74.4	74.4	74.4
	1996	58.9	96.8	77.8
	1998	71.7	71.7	71.7
	1999	114.6	114.6	114.6
	2000	73.5	73.5	73.5

Table 6.

WILSON POND
SWANZEY

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
OUTLET				
	1992	72.2	72.2	72.2
	1993	91.0	91.0	91.0
	1994	82.7	82.7	82.7
	1995	76.7	76.7	76.7
	1996	80.5	85.6	83.0
	1998	76.7	76.7	76.7
	1999	98.4	98.4	98.4
	2000	85.4	85.4	85.4
PIPE IN EAST COVE				
	2000	109.3	109.3	109.3

Table 8.

WILSON POND
SWANZEY

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1992	10	10	10
	1993	15	17	16
	1994	17	17	17
	1995	12	12	12
	1996	4	11	7
	1998	11	11	11
	1999	12	12	12
	2000	8	8	8
HYPOLIMNION				
	1993	14	14	14
	1994	10	10	10
	1996	7	13	10
	1998	11	11	11
	1999	14	14	14
INLET				
	1992	7	7	7
	1993	14	14	14
	1994	50	50	50
	1995	13	13	13
	1996	5	14	9
	1998	14	14	14
	1999	8	8	8
	2000	20	20	20
OUTLET				
	1992	11	11	11

Table 8.

WILSON POND
SWANZEY

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	1993	13	13	13
	1994	112	112	112
	1995	11	11	11
	1996	4	17	10
	1998	11	11	11
	1999	13	13	13
	2000	6	6	6

Table 9.

WILSON POND
SWANZEY

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
September 22, 2000			
0.1	19.4	6.3	68.1
1.0	19.4	6.3	68.1
2.0	19.4	6.2	67.8
3.0	19.2	6.2	67.0

Table 10.

WILSON POND

SWANZEY

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
October 9, 1992	2.5	12.1	8.6	79.8
August 1, 1993	4.0	22.5	2.2	25.0
August 22, 1994	4.0	20.7	5.2	57.0
August 16, 1995	4.0	23.1	0.4	5.0
August 21, 1996	3.5	24.2	6.5	77.0
July 30, 1998	3.5	24.1	7.6	89.0
August 9, 1999	3.0	23.3	6.2	72.4
September 22, 2000	3.0	19.2	6.2	67.0

Table 11.

WILSON POND
SWANZEY

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
EPILIMNION				
	1998	0.7	0.7	0.7
	1999	0.6	0.6	0.6
	2000	0.4	0.4	0.4
HYPOLIMNION				
	1998	1.1	1.1	1.1
	1999	0.6	0.6	0.6
INLET				
	1998	1.9	1.9	1.9
	1999	0.4	0.4	0.4
	2000	0.8	0.8	0.8
OUTLET				
	1998	1.1	1.1	1.1
	1999	0.6	0.6	0.6
	2000	0.3	0.3	0.3
PIPE IN EAST COVE				
	2000	0.1	0.1	0.1

Table 12.

WILSON POND

SWANZEY

Summary of current year bacteria sampling.
Results in counts per 100ml.

Location	Date	E. Coli See Note Below
EAST COVE		
	September 22	4
PIPE IN EAST COVE		
	September 22	0

NOTE: "<" means "less than" and ">" means "greater than"